Shallow shear wave velocity characterization of the urban Christchurch, New Zealand region

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Abstract

This poster provides a summary of the development of a 3D shallow (z<40m) shear wave velocity (Vs) model for the urban Christchurch, New Zealand region. The model is based on a recently developed Christchurch-specific empirical correlation between Vs and cone penetration test (CPT) data (McGann et al. 2014a,b) and the large high-density database of CPT logs in the greater Christchurch urban area (> 15,000 logs as of 01/01/2014). In particular, the 3D model provides shear wave velocities for the surficial Springston Formation, Christchurch Formation, and Riccarton gravel layers which generally comprise the upper 40m in the Christchurch urban area. Point-estimates are provided on a 200m-by-200m grid from which interpolation to other locations can be performed. This model has applications for future site characterization and numerical modeling efforts via maps of time-averaged Vs over specific depths (e.g. Vs30, Vs10) and via the identification of typical Vs profiles for different regions and soil behaviour types within Christchurch. In addition, the Vs model can be used to constrain the near-surface velocities for the 3D seismic velocity model of the Canterbury basin (Lee et al. 2014) currently being developed for the purpose of broadband ground motion simulation.